AL.2.2003-33
University of Alberta Library
0 1620 3409911 7

Pure MATHEMATICS 30

Module 2
Exponents and Logarithms
Assignment Booklet 2A

Learning Technologies Branch

Alberta LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Marks
Section 1 Assignment	35	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
General Public	
Other	

Pure Mathematics 30
Module 2: Exponents and Logarithms
Assignment Booklet 2A
Section 1 Assignment
Learning Technologies Branch
ISBN 0-7741-1643-9

ALL RIGHTS RESERVED

Copyright © 2000, the Crown in Right of Alberta, as represented by the Minister of Learning, Alberta Learning, 11160 Jasper Avenue, Edmonton, Alberta T5K 0L2. All rights reserved. Additional copies may be obtained from the Learning Resources Distributing Centre.

No part of this courseware may be reproduced in any form, including photocopying (unless otherwise indicated), without the written permission of Alberta Learning.

Every effort has been made both to provide proper acknowledgement of the original source and to comply with copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Learning so that appropriate corrective action can be taken.

IT IS STRICTLY PROHIBITED TO COPY ANY PART OF THESE MATERIALS UNDER THE TERMS OF A LICENCE FROM A COLLECTIVE OR A LICENSING BODY.

UNIVERSITY LIBRARY
UNIVERSITY OF ALBERTA

ASSIGNMENT BOOKLET 2A
MODULE 2: EXPONENTS AND LOGARITHMS
SECTION 1 ASSIGNMENT

Your mark for this module will be determined by how well you do your assignments in the Assignment Booklets.

This Assignment Booklet is worth 35 marks out of the total 100 marks for Module 2.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

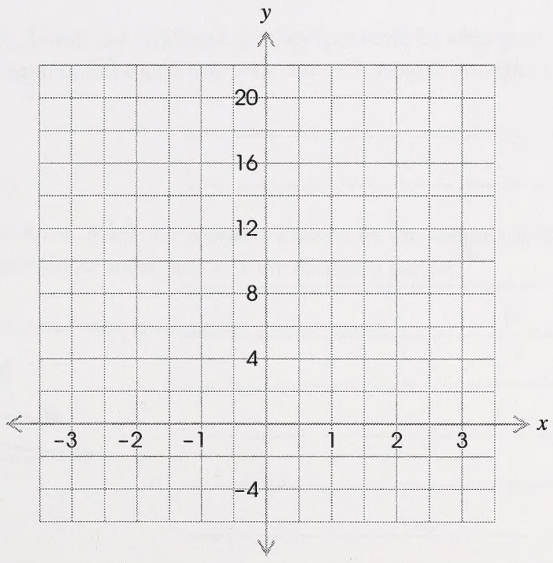
(35)

Section 1 Assignment: Exponential Functions

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

(2)

1. a. Draw the graph of $y = 4^x$ on the axes provided.



(4)

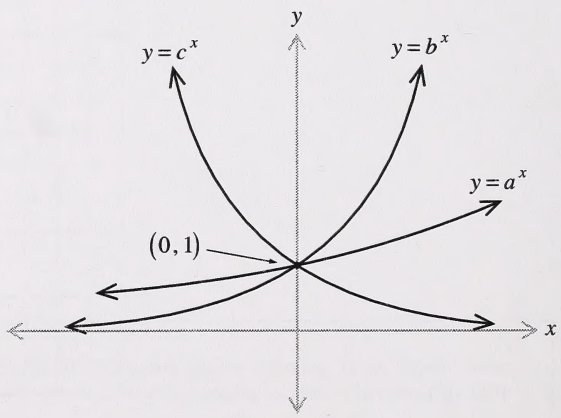
b. State the domain, range, intercepts, and asymptotes of the graph of $y = 4^x$.

(2)

c. The graph of $y = b^x$ is the reflection of $y = 4^x$ in the y-axis. State the value of b. Can the equation of the reflection of $y = 4^x$ be written another way? If so, what is it?

(4)

2. The graphs of three exponential functions are shown. Arrange the bases (a, b, and c) from smallest to largest. Explain why you chose this arrangement.



3. An investment of $1500 is earning interest at 12%, compounded quarterly (every 3 months).

(2) **a.** Write an exponential function for the amount, $A(t)$, of the investment after t years.

(2) **b.** How much will the investment be worth at the end of 35 years? Express your answer to the nearest cent.

4. The number of bacteria, $N(t)$, in a culture is given by the formula $N(t) = 2500 \times 2^{\frac{t}{d}}$, where t is the elapsed time (in minutes) and d is the doubling period.

(2) **a.** How many bacteria were there in the initial count?

(3) **b.** If there are 10 000 bacteria after 45 minutes, what is the doubling period, d?

5. The half-life of sodium-24 is 14.9 h. A medical facility buys a 50-mg sample.

(2) **a.** Determine the exponential function that models the amount, $A(t)$, of sodium-24 that will be present in the sample after t hours.

(2) **b.** How much sodium-24 will remain after 24 h? Round your answer to the nearest tenth.

(4) **c.** How much time will elapse until only 12.5% of the original amount of sodium-24 remains?

6. Solve each equation.

(3) **a.** $4^{8x-1} = 8$

(3) **b.** $3^{2x-5} = \frac{1}{27^{x}}$

Pure Mathematics 30
Assignment Booklet 2A
Module 2

LRDC

2000

AL.2.2003-33
NO ILL
c.2 v.2 (b)

Pure MATHEMATICS 30

Module 2

Exponents and Logarithms

Assignment Booklet 2B

Learning Technologies Branch

Alberta LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 2 Assignment	50	
Final Module Assignment	15	
	65	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
General Public	
Other	

Pure Mathematics 30
Module 2: Exponents and Logarithms
Assignment Booklet 2B
Section 2 Assignment and Final Module Assignment
Learning Technologies Branch
ISBN 0-7741-1718-4

ALL RIGHTS RESERVED

Copyright © 2000, the Crown in Right of Alberta, as represented by the Minister of Learning, Alberta Learning, 11160 Jasper Avenue, Edmonton, Alberta T5K 0L2. All rights reserved. Additional copies may be obtained from the Learning Resources Distributing Centre.

No part of this courseware may be reproduced in any form, including photocopying (unless otherwise indicated), without the written permission of Alberta Learning.

Every effort has been made both to provide proper acknowledgement of the original source and to comply with copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Learning so that appropriate corrective action can be taken.

IT IS STRICTLY PROHIBITED TO COPY ANY PART OF THESE MATERIALS UNDER THE TERMS OF A LICENCE FROM A COLLECTIVE OR A LICENSING BODY.

ASSIGNMENT BOOKLET 2B
MODULE 2: EXPONENTS AND LOGARITHMS
SECTION 2 ASSIGNMENT AND FINAL MODULE ASSIGNMENT

Your mark for this module will be determined by how well you do your assignments in the Assignment Booklets.

This Assignment Booklet is worth 65 marks out of the total 100 marks for Module 2.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

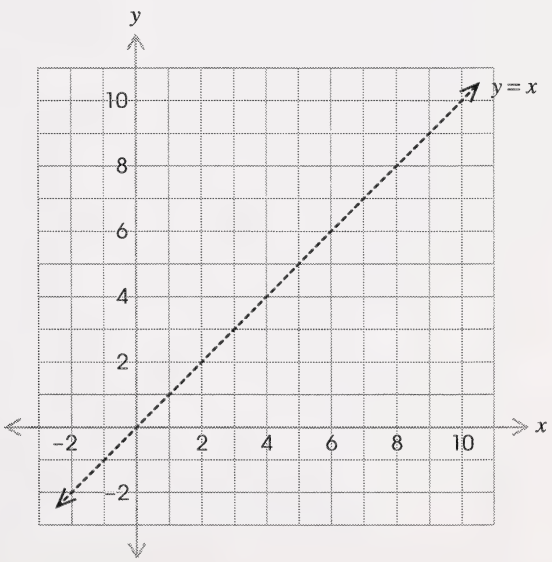
(50)

Section 2 Assignment: Logarithmic Functions

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

(5)

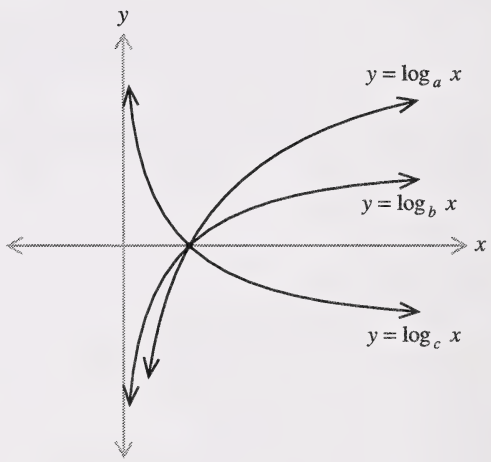
1. a. Write the equation, in the form $y = f(x)$, of the function that is the reflection of $y = 3^x$ in the line $y = x$. Then graph both functions on the grid provided.



(4) **b.** Complete the following table.

Graph	$y = 3^x$	$y = \log_3 x$
Domain		
Range		
***x*-intercept**		
***y*-intercept**		
Horizontal Asymptote		
Vertical Asymptote		

(4) **2.** The graphs of three logarithmic functions are shown. Arrange the bases (a, b, and c) from smallest to largest. Justify your answer.



(1) **3.** Express $4^{\frac{-1}{2}} = 0.5$ in logarithmic form.

(1) **4.** Express $\log_5 \sqrt{5} = 0.5$ in exponential form.

5. Solve for x.

(2) **a.** $x = \log_{36} 6$

(2) **b.** $\log_x 25 = -0.5$

(2) **c.** $\log_4 x = 2.5$

6. The 1933 earthquake in Japan registered 8.9 on the Richter scale.

(2) **a.** What would the Richter scale reading be of an earthquake that is only 0.01 times as intense as the earthquake in Japan?

(2) **b.** The 1985 earthquake in Peru registered 7.7 on the Richter scale. How many more times intense was the earthquake in Japan? Round your answer to one decimal place.

(3) **7.** Use the laws of logarithms to express $\log_2 6 - \log_2 3 + 2\log_2 \sqrt{8}$ as a single logarithm; then evaluate.

(3) **8.** For $\log y = \log(0.5x - 3) + \log 2$, state the domain. Then express y as a function of x.

(3) **9.** Apply the laws of logarithms to write $\log_c \left(\frac{\sqrt[3]{ac^2}}{b\sqrt{d}} \right)$ in expanded form.

(2) **10.** The formula for determining the pH of a solution is $\text{pH} = -\log[\text{H}^+]$, where $[\text{H}^+]$ is the hydrogen ion concentration (in M/L). What is the hydrogen ion concentration of an acid with a pH of 2.5?

(4) **11.** A radioactive substance decays from 16 g to 12.5 g in 5 years. What is the half-life of this substance? Round your answer to one decimal place.

(4) **12.** Solve $\log_2(x-1) = 5 - \log_2(x+3)$ for x.

(4) **13.** Prove the identity $\frac{1}{\log a} + \frac{1}{\log a} = \frac{1}{\log_{100} a}$.

(2) **14.** Evaluate $\log_5 11$. Round your answer to 2 decimal places.

15

Final Module Assignment

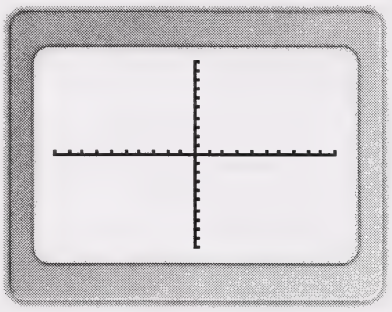
Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

(1)

1. a. What system of equations could you enter on your graphing calculator to solve the exponential equation $6^{x-1} = 7$.

(4)

b. Use your system of equations and your graphing calculator to solve the exponential equation given in question 1.a. Round your answer to 3 decimal places. Sketch your calculator display that gives your answer.



(4)

c. Solve $6^{x-1} = 7$ using logarithms. Round your answer to 3 decimal places.

(4) **2.** Solve $N(t) = N_0 (2)^{\frac{t}{d}}$ for t.

(2) **3.** If $\log_2 x = 7$, evaluate $\log_2 16x^2$.

Pure Mathematics 30
Assignment Booklet 2B
Module 2

LRDC

2000